



This former Pan-Am captain brings intelligent simulator technology and airline teaching methods to the pilot masses
By James Campbell

Wired For Realism



"RRRRR": The AST300 simulator and its accompanying little box can do everything a real plane can, and more. Only you have to contribute the engine noise.



Tucked away in an obscure corner of New Jersey's busy Teterboro Airport rests a most unusual flight school. Boasting more than 200 satisfied customers in the last three years, this establishment was started by a retired Pan American 747 captain. Captain Vince Reilly has a vast amount of experience in the field of aviation, especially in instrument flight procedures. His flight school specializes in (but is not restricted to) instrument and multi-engine flight training—two of the most demanding (and hazardous) facets of the aviation educational spectrum. The most unusual part of this story is that the captain does all of this in a second-floor suite of offices. You see, Captain Reilly's flight school has no airplanes.

Reilly is one of those people who has learned the benefits of good high-tech
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simulation firsthand. As one of the many highly trained pilots who has commanded the large behemoths that trundle throughout the busy skies, Reilly has many hours of simulator training. The simulator has become far and away the top means of upgrading and maintaining the proficiency of pilots who handle the heavy iron.

When Reilly left Pan Am, he was faced with the typical dilemma of all those sky jockeys who simply can't get the aeronautical bugs out of their bloodstream. He knew that he wanted to teach, but was unsure as to how he could best do the kind of instruction from which he had benefited for years. His first sight of a new high-tech flight simulator convinced him that there was an alternative to high-priced simulator instruction and that it could be made available to the

average private or commercial pilot. The decision was a good one, since he has been keeping two of these super-tech wonderkind whirring and purring almost full time in the suite of offices that once housed the Teterboro GADO.

The AST 300 is a large piece of equipment that dominates each of the rooms it occupies at Computer Flight. It is not even remotely portable. A full-size "generic" cockpit complete with a center console hosting throttles, prop controls, mixtures and many other devices is topped by a windshield that encloses a modest, computer-generated visual display. The entire left side is filled with a versatile IFR panel that can include such goodies as a HSI, RMI and KNS-80 RNAV. The instruments and radios are precise replicas of the real gear currently installed in thousands of real aircraft

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cockpits. The flight characteristics are designed to emulate those effects found in real aircraft in real conditions. The AST 300 displayed behavior consistent with the change in flight characteristics that occurs with different pressure altitudes and airspeeds, the region of reverse command, trim effect, Vmc and Vyse (on Multi-engine version), and even inverted flight.

Navigational exercises are conducted with "real live" nav charts, since the AST 300 utilizes preprogrammed navigational PROMs that reproduce real everyday frequencies, ILS courses, runway headings and field elevations. Each PROM covers a large area and differs little, if at all, from the real world as we know it. PROMs are even updated occasionally to compensate for those ever-changing revisions to nav aids and other facilities. The visual display is a simple computer-generated black-and-white representation of the runway, ground and the horizon. This display can be adjusted to reflect deteriorating meteorological conditions or evening visibilities. The instructor can select ceiling and visibility by adjusting the master console. The instructor console also can be used to induce a scud of troublesome engine and instrument failures. Ground track can be monitored on a small plotter display that boasts a variable scale which can be adapted to reflect progress against (and trace over) a specific chart.

Reilly's initial demonstration included some hair-raising engine-out approaches to minimums at real airports all over the New York area. I participated in several scenarios that are simply too dangerous to do in a real airplane. The AST 300 accomplished a host of normal and unusual maneuvers without revealing any tell-tale, non-aerodynamic behavior and it faithfully reproduced every control input in a flawless (if not embarrassing) representation of my efforts.

Reilly explained that AST 300 was designed to not only aid the role of normal flight-training, but to replace much of the work currently being conducted in real airplanes. For a simulator to be this versatile requires a degree of capability that heretofore had been unknown in the general aviation world without spending millions of scarce flying dollars.

The machine that I spent most of my time in was the multi-engine trainer complete with a full host of IFR gear, including the KNS-80 RNAV and an HSI. From what I understand, nearly all of the simulators that AST manufactures these days are of the multi-engine persuasion since they can be easily operated as a single-engine aircraft and cost just a little bit more than the singles. Within the space of several sweaty, instrument referenced hours, I got to re-enact a host of the most

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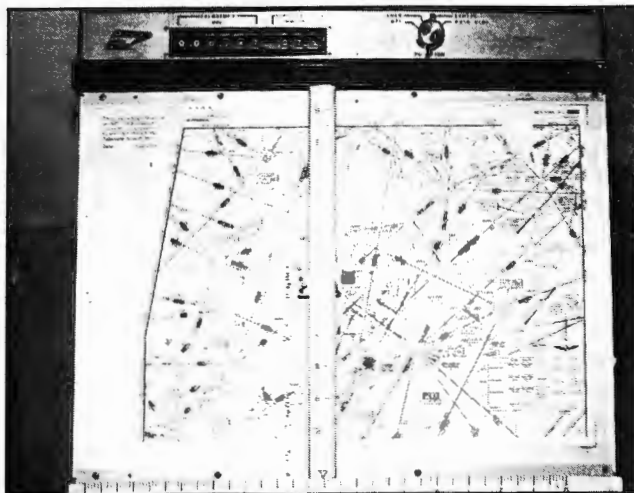


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dangerous "accident-in-the-making" scenarios known to aviation. I must have left a hundred computerized smoking holes all the way from Albany to Hoboken.

One of the most valuable (and sobering) demonstrations called for Reilly to dial-in lowered visibilities on a non-precision approach after the field was called "in sight." The sudden go-around undertaken after that initial bit of "field in sight" feeling of relief can do wonders to solving much of the complacency that lands so many pilots in a world of hurt.

An excellent example of the AST 300's training potential was experienced during the power failures on takeoff. Reilly worked his malevolent magic to investigate and discuss the reaction process that would lead to a decision to continue flight or to attempt a landing back on the runway. A very welcome feature of this device is the ability to push a button on the far right side of the panel labeled "Flight Hold." This freezes the action of the display and the instruments to allow a leisurely, no-pressure examination of the developing situation. If necessary, it is possible to leave a particular position and start over at an earlier point or to continue.

Through proper manipulation of the instructor panel, Reilly showed me how he could raise the oil temp and lower the oil pressure slowly to simulate impending power gremlins—an item that is unfortunately neglected in many cases until the engine gets the pilot's attention by having a serious case of the hiccups. Instrument failures followed by the transition to partial panel references were particularly valuable since the actual occurrence of these emergencies is far more subtle than having an instructor throw a stickum pad (or as my old instructor used to do, place a \$20 bill) over a few of the gauges. The environment was

every bit as real as the cockpit, with the exception of the attendant rock-and-rolling motion (something that, frankly, I was happy to do without).

I have found that the addition of a motion base (a complex device that moves the entire simulator in reaction to control manipulation) can tell you little more than the fact that something has changed, since the inner ear can be easily fooled into believing in an incorrect attitude. The lack of the motion base simply means that one has to be a bit more aware of changes in the flight conditions of the vehicle and must learn to detect less aggressive clues. This would seem to sharpen one's perceptions of the instrument environment.

To the unenlightened, the AST's principle value would seem to be greatest for those persons pursuing instrument or multi-engine training. It has also proven to be quite valuable to primary flight students learning navigation, communications procedures, initial instrument reference integration and even ground reference maneuvers (when used in conjunction with the optional plotter).

Since it does lack a motion base and does not specifically mimic the performance of a specific aircraft's characteristics, the higher-end commercial applications are still limited to a sharpening of skills or basic instrument recurrency. From what I understand, the FAA does allow for half the time and half the approaches required to maintain basic IFR competency as well as a small portion of some licensing requirements to be completed on ground-based trainers like the AST. Some loosening up of Part 135 and 121 regs is obviously in order to allow for usage of the AST 300 by charter operators and airlines. Despite the conservative nature of the above-mentioned federals, the AST 300 has seen quite a bit of usage by these

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The value of such a system is quite obvious after you see it in action. AST utilized this system recently to aid the National Intercollegiate Flying Association's SAFECON series of competitive flying events. Students were required to fly specific patterns of timed straight and level flight, climbs, descents and turns, which were evaluated by the

There is little or no question that the AST series of simulators represents a significant breakthrough in bringing additional versatility, in an economical fashion, to the flight training environment. Lest you get the wrong idea about these electronic marvels, be assured that an AST multi-engine simulator loaded with the most commonly requested goodies is still going to cost at least \$75,000. Still, the AST 300 would seem to be a more than reasonable investment for operators willing to support the usage of such a device by involving it heavily in their program of instruction and seeing that their instructors know how to take advantage of its capabilities. The cost might not be all that prohibitive once the operator takes into account the fact that this is a device that does not have to be hangared or fueled, has never been the recipient of an

Coupled with the assistance of a well-traveled and highly-experienced instructor beside each student, the AST 300 just may be a key to the survival of many pilots who would otherwise have been unprepared for the unexpected. Vince Reilly and Computer Flight Inc. have proven that safe and professional flight training no longer has to be the property of those with the biggest checkbooks. *P&P*

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